

WHAT IS CLAIMED IS

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1. A ~~projection-type display device~~

comprising:

a projection surface on which a predetermined projection image is displayed through projection;

10 a writing surface on which an image can be drawn directly in a superimposing manner with the projection image displayed on said projection surface; and

15 a photography part photographing an image drawn on said writing surface by means of an image-pickup part comprising two-dimensionally-disposed pixels

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2. The projection-type display device as

claimed in claim 1, further comprising a projection part which emits a light beam comprising an image signal onto said projection surface so as to display the

25 ~~predetermined image on said projection surface.~~

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3. The projection-type display device as claimed in claim 2, wherein:

5 said writing surface comprises the same surface as said projection surface or is located on the same the side of said projection surface as that on which a user who draws an image onto said writing surface exists; and

10 said display device further comprises an extracting part extracting a user-drawn image from an image photographed by said photography part.

15 4. The projection-type display device as claimed in claim 3, further comprising a combining part combining at least a part of the projection image projected onto said projection surface with the user-drawn image extracted by said extracting part.

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25 5. The projection-type display device as claimed in claim 4, wherein:

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a mode selecting part is provided through which a selection is made between a first photography mode in which the user-drawn image is obtained and a second photography mode in which the combined image is  
5 obtained.

10 6. The projection-type display device as claimed in claim 1, wherein the optical axis of said photography part is perpendicular to said writing surface.

15 7. The projection-type display device as claimed in claim 1, further comprising a part making a  
20 correspondence between the projection image and drawn image.

25 8. The projection-type display device as

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claimed in claim 1, further comprising:

an input part inputting the projection image externally;

a recording part recording at least one of the  
5 projection image, user-drawn image and combined image;  
and

an output part outputting the user-drawn image externally.

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9. The projection-type display device as  
claimed in claim 1, further comprising a blocking part  
15 blocking a light beam emitted from a projecting part  
projecting the light beam onto said projection surface  
so as to display the projection image thereon.

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10. The projection-type display device as  
claimed in claim 1, wherein:

a shifting part shifting a photography area of  
25 said photography part on said writing surface is

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provided;

said photography part takes a photograph  
several times in a manner such that the photography area  
thereof is shifted each time by means of said shifting  
5 part; and

a combining part is provided, and, thereby,  
photographed images obtained through the several times  
of photography are combined.

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11. The projection-type display device as  
claimed in claim 10, wherein;

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said shifting part shifts the photography area  
by a distance corresponding one pixel each time;

said shifting part comprises a piezoelectric  
device; and

the vibration distance of said piezoelectric  
20 device corresponds to one pixel.

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12. The projection-type display device as

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claimed in claim 1, wherein:

said writing surface is divided into a plurality of areas;

said photography part takes a plurality of  
5 photographs of respective ones of the plurality of areas; and

a combining part is provided, and, thereby, a thus-obtained plurality of photographed images are combined.

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13. The projection-type display device as  
15 claimed in claim 1, wherein:

a moving part moving a photography area of said photography part on said writing surface is provided;

said photography part takes a photograph  
20 several times in a manner such that the photography area thereof each time corresponds to a different division of said writing surface; and

a combining part is provided, and, thereby, photographed images obtained through the several times  
25 of photography are combined.

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14. The projection-type display device as claimed in claim 13, further comprising a part displaying the photography area onto said projection surface.

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15. The projection-type display device as  
10 claimed in claim 12, further comprising an input part through which instructions of at least one of whether or not a dividing photography is performed in which a part or all of said writing surface is divided and each division is photographed, and the number of divisions in  
15 the dividing photography, are input.

20 16. The projection-type display device as claimed in claim 13, further comprising an input part through which instructions of at least one of whether or not a dividing photography is performed in which a part or all of said writing surface is divided and each  
25 division is photographed, and the number of divisions in

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the dividing photography, are input.

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17. The projection-type display device as claimed in claim 1, further comprising a lighting part illuminating said writing surface from a side opposite to a side on which said photography part is provided.

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18. The projection-type display device as claimed in claim 1, further comprising at least one lighting part illuminating said writing surface from a side on which said photography part is provided.

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19. The projection-type display device as claimed in claim 17, wherein said lighting part comprises a plurality of light sources located symmetrically with respect to a central axis of said writing part or an axis corresponding to an optical axis

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of a part projecting the projecting image onto said projection surface.

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20. The projection-type display device as claimed in claim 18, wherein said lighting part comprises a plurality of light sources located  
10 symmetrically with respect to a central axis of said writing part or an axis corresponding to an optical axis of a part projecting the projecting image onto said projection surface.

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21. The projection-type display device as claimed in claim 1, further comprising a dispersion  
20 surface removably provided on a surface of said writing surface opposite to a user who draws an image on said writing surface.

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22. The projection-type display device as claimed in claim 1, further comprising:

a dispersion sheet comprising a dispersion area which covers all or a part of said writing part and  
5 a transparent area which transmits, to said writing surface, at least a part of a light beam emitted by a part which projects the projection image onto said projection surface; and

a moving part moving said dispersion sheet.

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23. A projection-type display device  
15 connected to a computer via a communication network, and operating according to instructions given by said computer, comprising:

a projection surface on which a predetermined projection image is displayed through projection;

20 a writing surface on which an image can be drawn directly in a superimposing manner with the projection image displayed on said projection surface; and

a photography part photographing an image  
25 drawn on said writing surface by means of an image-

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pickup part comprising two-dimensionally-disposed pixels.

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24. A computer readable recording medium storing a software program for operating a projection-type display device which comprises:

10 a projection surface on which a predetermined projection image is displayed through projection;

a writing surface on which an image can be drawn directly in a superimposing manner with the projection image displayed on said projection surface; and

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a photography part photographing an image drawn on said writing surface by means of an image-pickup part comprising two-dimensionally-disposed pixels,

wherein said software program is read by a computer which thus performs the following steps:

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a) making said photography part to take a photograph of said writing surface; and

b) extracting an image drawn by a user onto said writing surface, from the photographed image obtained through said step a).

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25. The computer readable recording medium as claimed in claim 24, wherein said software program causes the computer to further perform the following step:

- 5 c) combining at least a part of the projection image projected onto said projection surface with the user-drawn image extracted by said step b).

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26. The computer readable recording medium as claimed in claim 25, wherein said software program causes the computer to further perform the following  
15 step:

- d) causing a user to select a mode between a first photography mode in which the user drawn image is obtained and a second photography mode in which the combined image is obtained.

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27. The computer readable recording medium as  
25 claimed in claim 24, wherein said software program

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causes the computer to further perform the following steps:

5 c) causing said photography part to take a plurality of photographs of respective ones of a predetermined plurality of divisions of said writing surface; and

d) combining a thus-obtained plurality of photographed images.

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28. The computer readable recording medium as claimed in claim 24, wherein said software program  
15 causes the computer to further perform the following steps:

c) moving a photography area of said photography part on said writing surface;

20 d) causing said photography part to take a photograph several times in a manner such that the photography area thereof each time corresponds to a different division of said writing surface; and

e) combining photographed images obtained through the several times of photography.

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29. The computer readable recording medium as claimed in claim 27, wherein said software program causes the computer to further perform the following steps:

- 5 e) causing a user to determine at least one of whether or not a dividing photography is performed in which a part or all of said writing surface is divided and each division is photographed, and the number of divisions in the dividing photography.

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30. The computer readable recording medium as claimed in claim 28, wherein said software program causes the computer to further perform the following steps:

- 15 f) causing a user to determine at least one of whether or not a dividing photography is performed in which a part or all of said writing surface is divided and each division is photographed and, the number of divisions in the dividing photography.

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31. A software program for operating a projection-type display device which comprises:

a projection surface on which a predetermined projection image is displayed through projection;

5 a writing surface on which an image can be drawn directly in a superimposing manner with the projection image displayed on said projection surface; and

10 a photography part photographing an image drawn on said writing surface by means of an image-pickup part comprising two-dimensionally-disposed pixels,

wherein said software program is read by a computer which thus performs the following steps:

15 a) making said photography part to take a photograph of said writing surface; and

b) extracting an image drawn by a user onto said writing surface, from the photographed image obtained through said step a).

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32. The software program as claimed in claim 31, wherein said software program causes the computer to  
25 further perform the following step:

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c) combining at least a part of the projection image projected onto said projection surface with the user-drawn image extracted by said step b).

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33. The software program as claimed in claim 32, wherein said software program causes the computer to further perform the following steps:

d) causing a user to select a mode between a first photography mode in which the user-drawn image is obtained and a second photography mode in which the combined image is obtained.

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34. The software program as claimed in claim 31, wherein said software program causes the computer to further perform the following steps:

c) causing said photography part to take a plurality of photographs of respective ones of a predetermined plurality of divisions of said writing surface; and

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d) combining a thus-obtained plurality of photographed images.

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35. The software program as claimed in claim 31, wherein said software program causes the computer to further perform the following steps:

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c) moving a photography area of said photography part on said writing surface;

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d) causing said photography part to take a photograph several times in a manner such that the photography area thereof each time corresponds to a different division of said writing surface; and

e) combining photographed images obtained through the several times of photography.

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36. The software programs as claimed in claim 34, causing the computer to further perform the following steps:

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e) causing a user to determine at least one of

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whether or not a dividing photography is performed in which a part or all of said writing surface is divided and each division is photographed, and the number of divisions in the dividing photography.

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37. The software program as claimed in claim 10 35, causing the computer to further perform the following steps:

f) causing a user to determine at least one of whether or not a dividing photography is performed in which a part or all of said writing surface is divided 15 and each division is photographed, and the number of divisions in the dividing photography.

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